

What is claimed is:

- 1) An article for converting energy from one form to another comprising;
  - a) a pitch-derived graphitic foam carbon foam substrate, and
  - b) a single layer coating infiltrated and deposited to all exposed surfaces of said substrate wherein said single layer coating is selected from the group consisting of silicon carbide and carbides formed from a Group IVA metal.
- 2) An article in accordance with claim 1 wherein said energy conversion comprises at least one of the following:
  - a) the conversion of RF energy to sensible heat;
  - b) the conversion of absorbed radiant energy to sensible heat;
  - c) the conversion of sensible heat to radiant energy; and,
  - d) the conversion of electron kinetic energy to sensible heat.
- 3) An article in accordance with claim 1 wherein said carbon foam substrate has a modulus of elasticity in the range of approximately 160 to 200 Mpa.
- 4) An article in accordance with claim 1 wherein said carbon foam substrate has a specific conductivity in the range of approximately 100 to 150 W/m-°K.
- 5) An article in accordance with claim 1 wherein said coating substantially coats the pores of said carbon foam to a thickness in the range of approximately 10 to 50 microns.
- 6) An article in accordance with claim 1 wherein said article has an overall coefficient of thermal expansion of approximately 2 ppm/°C.
- 7) An article in accordance with claim 1 wherein said single layer coating is applied using at least one technique selected from the group consisting of chemical vapor deposition, chemical vapor infiltration, plasma spraying, and painting.

- 8) An article in accordance with claim 1 wherein said article is a radio frequency  
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